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[Vliyaniye temperaturnogo rezhima na effektivnost' neresta sudaka]

A.Ye. Gorodnichiy

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THE EFFECT OF THE TEMPERATURE REGIME ON THE EFFECTIVENESS OF SPAWNING OF THE PIKE-PERCH LUCIOPERCA LUCIOPERCA

A.Ye. Gorodnichiy

The Pike-Perch is the most important commercial fish of the Sea of Azov. In 1936, its catch reached 736,000 centners, and the mean multiyear catch (from 1927 until the construction of the Psimlyansk Dam on the Don) comprised 340,000 centners.

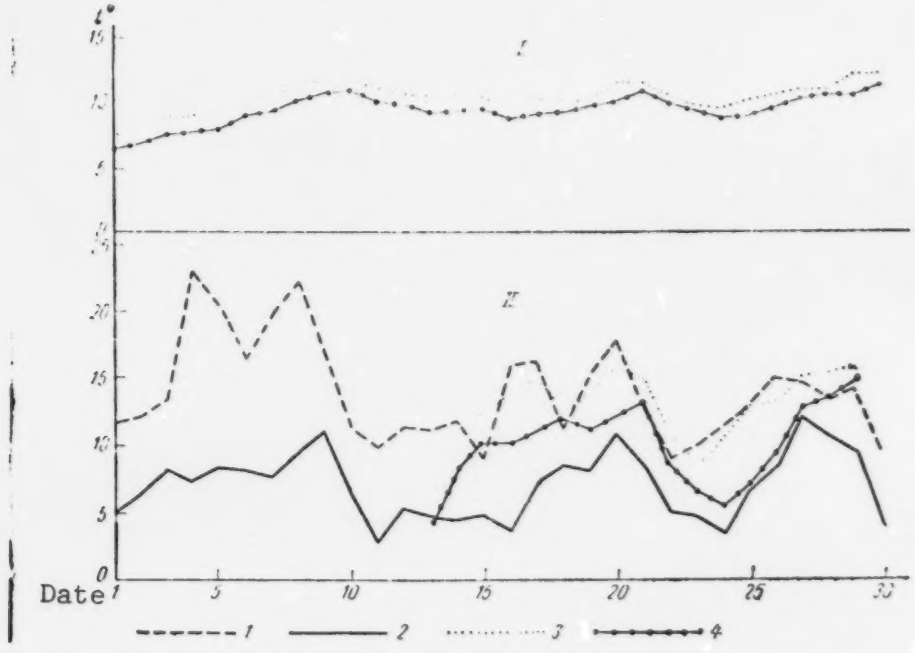
Since there is no doubt that regulation of the Don River sharply worsens the conditions of spawning of the Pike-Perch, spawning-nurseries – fish farms – were constructed. Here the Pike-Perch spawns and its fry grow to a weight of 1.5 g, after which they are released in the sea for further growth.

The operation of fish farms has shown that the hatching rate of Pike-Perch fry is subject to sharp fluctuations and in an overwhelming majority of cases is slight. This primarily occurs because the conditions for breeding of the Pike-Perch in fish farms are extremely unfavorable as a rule. Particularly indicative are the data for 1961. In the Southern reservoir of the Rogozhkin spawning-nursery (its aquatorium comprises 508 ha), the Pike-Perch began to spawn on 7 April (the second day following placement in the reservoir). Such early spawning was induced by high water temperature, since from 4 through 9 April, as the result of sudden warming, atmospheric temperature reached 23°. According to the data of the fish husbandrymen of the nursery, the water heated to 18° at this time. Soon, however, temperature in the reservoir sharply dropped to 4°, and then from 15 through 21 April once again increased to 16° (Figure). From 22 April onward, it began to get colder and by 24 April water temperature had decreased to 5.5°. The water began to warm to 15.7° only after 26 April.

The sharp drop in water temperature led to the death of about 50% of the deposited eggs. The remaining eggs continued to develop, but the hatched larvae were primarily poorly mobile; their fat capsules proved to be either empty or contained a small quantity of fat;

about 20% of the larvae had unpigmented or weakly pigmented eyes. Subsequently, all of these larvae perished.

Hence, sharp fluctuations in water temperature led to massive death of the eggs and disrupted the normal development of the egg, as the result of which most of the hatched larvae proved to be non-viable.



Temperature dynamics in the Southern reservoir of the Rogozhkin fish farm and in the river Don (April, 1961)

I - river Don;
II - Southern reservoir;
1 - maximum t° of air;
2 - minimum t° of air;
3 - maximum t° of water;
4 - minimum t° of water.

As is known, in addition to other conditions, the temperature regime of the reservoir depends upon the type of reservoir. In this case, as the result of shallow water and other characteristics of the reservoir, temperature within it most closely depended upon the temperature of air masses and temperature fluctuations over the course of a day reached 10-11°. At the same time, the temperature of Don river water changes very slowly, without sharp jumps, and with daily fluctuations of 1.8° (Figure). To the point, under natural conditions, the Don Pike-Perch spawns predominantly in places with current, where water exchange with the river facilitates a more or less stable temperature regime.

Breeding of the Pike-Perch in the spawning-nurseries existing on the Don cannot produce any stable results as the result of a complete dependency of the temperature regime of reservoirs on weather conditions. Only with a random degree of favorable circumstances does the development of the roe occur more or less normally. Thus, in 1960, in the same Southern reservoir of the Rogozhkin fish farm, the development of the roe coincided with extremely favorable temperatures (10-16°). According to the data of O. D. Romanycheva, the waste roe over the period of incubation comprised a total of 10%, while the yield of spawn was the highest over all years of operation of the reservoir.

Thus, at any time, one of the primary problems of biotechnology of the Pike-Perch young in the Don fish farms is obtaining fully developed Pike-Perch larvae, for which a favorable temperature regime in the incubation period is vital.